

Isolation and Molecular Identification of Cellulase-Producing Bacillus Strains From The Forest Soil

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Background & Objectives: Cellulose is the best carbohydrate storage molecule for production of energy in biological systems. Bacterial and Fungal Cellulases play an important role in hydrolysis and use of cellulose. Endoglucanases hydrolyze glycosidic bonds in cellulose and convert it to glucose. The aim of this study was to isolate and identify new strains of the genus Bacillus from the forest soil, with the ability to produce cellulase.

Methods: in this study was conducted from different 35 soils the forest located in the West of Mazandaran, Iran, and 40 bacterial isolates were collected of this located and Finally were isolated 24 bacterial by using Gram's iodine test for their ability in production of cellulase on carboxymethyl cellulose (CMC agar) . The temperature and time optimization were thereafter performed on the strains. The bacterial species were identified by 16S rDNA sequencing and the approximate molecular weight of the enzyme was determined by protein precipitation and SDS-PAGE.

Results: A number of 5 strains belonging to the 5 species including Bacillus Cereus, Bacillus Subtilis, Bacillus Thuringiensis, Bacillus megaterium and Bacillus mycoides, were identified in this study. The highest amounts of the enzyme were produced at 37 °C for 96 hours by all identified species. The highest level of cellulase production belonged to a Bacillus Subtilis strain with 3.8 u/ml. The molecular weight of cellulase isolated from this strain was determined to be about 60 kDa.

Conclusion: This study shows the high potential of cellulase production by Bacillus species isolated from the forested areas. These bacteria can directly be used for production of glucose syrup from vegetable fibers a well as in other industries

Keywords: Molecular Identification; Bacillus; Cellulases